

## SEQUENCE LISTING

## (1) GENERAL INFORMATION:

- 5 (i) APPLICANTS: Lex M. Cowsert  
Brenda F. Baker  
John McNeil  
Susan M. Freier  
Henri M. Sasmor  
10 Douglas G. Brooks  
Cara Ohashi  
Jacqueline R. Wyatt  
Alexander Borchers
- (ii) Title of Invention: Identification of Genetic  
15 Targets for Modulation By Oligonucleotides and  
Generation of Oligonucleotides for Gene  
Modulation
- (iii) NUMBER OF SEQUENCES: 112
- (iv) CORRESPONDENCE ADDRESS:  
20 (A) ADDRESSEE: JOHN W. CALDWELL  
WOODCOCK WASHBURN KURTZ  
MACKIEWICZ & NORRIS  
(B) STREET: 1 LIBERTY PLACE 46TH FLOOR  
(C) CITY: PHILADELPHIA  
25 (D) STATE: PA  
(E) COUNTRY: USA  
(F) ZIP: 19003
- (v) COMPUTER READABLE FORM:  
(A) MEDIUM TYPE: DISKETTE, 3.5 INCH, 1.44 MB  
30 STORAGE  
(B) COMPUTER: IBM  
(C) OPERATING SYSTEM: PC-Windows NT  
(D) SOFTWARE: WORD PERFECT 6.1
- (vi) CURRENT APPLICATION DATA:  
35 (A) APPLICATION NUMBER: not assigned  
(B) FILING DATE: Herewith

09067638-042895

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(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER:

(B) FILING DATE:

5 (viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: John W. CaldwellHerb Boswell

(B) REGISTRATION NUMBER: 28,937

(C) REFERENCE/DOCKET NUMBER: ISIS-2960

(ix) TELECOMMUNICATION INFORMATION:

10 (A) TELEPHONE: (215) 568-3100

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(2) INFORMATION FOR SEQ ID NO: 1

15 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1

CCAGGCGGCA GGACCACT

18

25 (2) INFORMATION FOR SEQ ID NO: 2

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

30 (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2

GACCAGGCGG CAGGACCA

18

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(2) INFORMATION FOR SEQ ID NO: 3

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858240-8E929060

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3

AGGTGAGACC AGGCGGCA

18

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(2) INFORMATION FOR SEQ ID NO: 4

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4

CAGAGGCAGA CGAACCAT

18

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(2) INFORMATION FOR SEQ ID NO: 5

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5

GCAGAGGCAG ACGAACCA

30

18

(2) INFORMATION FOR SEQ ID NO: 6

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid

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(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6

GCAAGCAGCC CCAGAGGA

5 18

(2) INFORMATION FOR SEQ ID NO: 7

(i) SEQUENCE CHARACTERISTICS:

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(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7

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GGTCAGCAA GCAGCCCCA

18

(2) INFORMATION FOR SEQ ID NO: 8

20

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8

25

GACAGCGGTC AGCAAGCA

18

30 (2) INFORMATION FOR SEQ ID NO: 9

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

35

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9

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GATGGACAGC GGTCAGCA

18

5 (2) INFORMATION FOR SEQ ID NO: 10

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

10 (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10

TCTGGATGGA CAGCGGTC

18

15

(2) INFORMATION FOR SEQ ID NO: 11

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

20 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11

GGTGGTTCTG GATGGACA

18

25

(2) INFORMATION FOR SEQ ID NO: 12

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

30 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12

GTGGGTGGTT CTGGATGG

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18

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## (2) INFORMATION FOR SEQ ID NO: 13

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13

GCAGTGGGTG GTTCTGGA

## (2) INFORMATION FOR SEQ ID NO: 14

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14

CACAAAGAAC AGCACTGA

18

## (2) INFORMATION FOR SEQ ID NO: 15

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15

CTGGCACAAA GAACAGCA

18

## (2) INFORMATION FOR SEQ ID NO: 16

## (i) SEQUENCE CHARACTERISTICS:

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(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19

TCACTCACCA GTTTCTGT

18

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(2) INFORMATION FOR SEQ ID NO: 20

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

10

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20

GTGCAGTCAC TCACCACT

15

18

(2) INFORMATION FOR SEQ ID NO: 21

(i) SEQUENCE CHARACTERISTICS:

20

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21

ACTCTGTGCA GTCCTCA

25

18

(2) INFORMATION FOR SEQ ID NO: 22

30

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

35

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22

CAGTGAAGTC TGTGCACT



18

## (2) INFORMATION FOR SEQ ID NO: 23

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## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

10

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23

ATTCCGTTTC AGTGAAC

18

15

## (2) INFORMATION FOR SEQ ID NO: 24

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

20

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24

GAAGGCATTC CGTTTCAG

18

25

## (2) INFORMATION FOR SEQ ID NO: 25

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

30

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25

TTCACCGCAA GGAAGGCA

18

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## (2) INFORMATION FOR SEQ ID NO: 26

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26

CTCTGTTCCA GGTGTCTA

18

## (2) INFORMATION FOR SEQ ID NO: 27

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27

CTGGTGGCAG TGTGTCTC

18

## (2) INFORMATION FOR SEQ ID NO: 28

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28

TGGGGTCGCA GTATTTGT

18

## (2) INFORMATION FOR SEQ ID NO: 29

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32  
CTGAGGTGCC CTTCTGCT

18

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(2) INFORMATION FOR SEQ ID NO: 33

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

10 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33  
GTGTCTGTTT CTGAGGTG

18

15

(2) INFORMATION FOR SEQ ID NO: 34

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

20 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34  
TGGTGTCTGT TTCTGAGG

25 18

(2) INFORMATION FOR SEQ ID NO: 35

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35  
ACAGGTGCAG ATGGTGTC

35

18

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## (2) INFORMATION FOR SEQ ID NO: 36

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

5 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36

TTCACAGGTG CAGATGGT

10 18

## (2) INFORMATION FOR SEQ ID NO: 37

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

15 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37

GTGCCAGCCT TCTTCACA

20 18

## (2) INFORMATION FOR SEQ ID NO: 38

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

25 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38

TACAGTGCCA GCCTTCTT

30 18

## 35 (2) INFORMATION FOR SEQ ID NO: 39

## (i) SEQUENCE CHARACTERISTICS:

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- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

5           (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39  
            GGACACAGCT CTCACAGG

18

10       (2) INFORMATION FOR SEQ ID NO: 40

         (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

15

         (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40  
            TGCAGGACAC AGCTCTCA

18

20

         (2) INFORMATION FOR SEQ ID NO: 41

         (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

25

         (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41  
            GAGCGGTGCA GGACACAG

18

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         (2) INFORMATION FOR SEQ ID NO: 42

         (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

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(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42  
AAGCCGGGCG AGCATGAG

18

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(2) INFORMATION FOR SEQ ID NO: 43

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

10

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 43  
AATCTGCTTG ACCCCAAA

15

18

(2) INFORMATION FOR SEQ ID NO: 44

(i) SEQUENCE CHARACTERISTICS:

20

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44  
GAAACCCCTG TAGCAATC

25

18

(2) INFORMATION FOR SEQ ID NO: 45

30

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45  
GTATCAGAAA CCCCTGTA

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18

## (2) INFORMATION FOR SEQ ID NO: 46

## 5 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## 10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46

GCTCGCAGAT GGTATCAG

18

## 15 (2) INFORMATION FOR SEQ ID NO: 47

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

20 (D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 47

GCAGGGCTCG CAGATGGT

18

25

## (2) INFORMATION FOR SEQ ID NO: 48

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

30 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48

TGGGCAGGGC TCGCAGAT

18

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## (2) INFORMATION FOR SEQ ID NO: 49

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

5 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49

GACTGGGCAG GGCTCGCA

18

10

## (2) INFORMATION FOR SEQ ID NO: 50

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

15 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50

CATTGGAGAA GAAGCCGA

20 18

## (2) INFORMATION FOR SEQ ID NO: 51

## (i) SEQUENCE CHARACTERISTICS:

25 (A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 51

30 GATGACACAT TGGAGAAG

18

## (2) INFORMATION FOR SEQ ID NO: 52

35 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

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(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 52

5 GCAGATGACA CATTGGAG

18

(2) INFORMATION FOR SEQ ID NO: 53

10 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 53

TCGAAAGCAG ATGACACA

18

20 (2) INFORMATION FOR SEQ ID NO: 54

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

25 (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 54

GTCCAAGGGT GACATTTT

18

30

(2) INFORMATION FOR SEQ ID NO: 55

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

35 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 55  
CACAGCTTGT CCAAGGGT

18

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(2) INFORMATION FOR SEQ ID NO: 56

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

10 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 56  
TTGGTCTCAC AGCTTGTC

18

15

(2) INFORMATION FOR SEQ ID NO: 57

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

20 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 57  
CAGGTCTTTG GTCTCACA

25

18

(2) INFORMATION FOR SEQ ID NO: 58

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 58

35

CTGTTGCACA ACCAGGTC

18

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## (2) INFORMATION FOR SEQ ID NO: 59

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

5 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 59

GTTTGTGCCT GCCTGTTG

10 18

## (2) INFORMATION FOR SEQ ID NO: 60

## (i) SEQUENCE CHARACTERISTICS:

15 (A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60

20 GTCTTGTTTG TGCCTGCC

18

## (2) INFORMATION FOR SEQ ID NO: 61

## 25 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## 30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61

CCACAGACAA CATCAGTC

18

## 35 (2) INFORMATION FOR SEQ ID NO: 62

## (i) SEQUENCE CHARACTERISTICS:

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INFORMATION FOR SEQ ID NO: 63

15

(D) TOPOLOGY: linear

18

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(i) SEQUENCE CHARACTERISTICS:

25

(D) TOPOLOGY: linear

18

30

(i) SEQUENCE CHARACTERISTICS:

35

(C) STRANDEDNESS: single



(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 65  
GGGATCACCA CCAGGGCT

18

5

(2) INFORMATION FOR SEQ ID NO: 66

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

10

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 66  
GAGGATGGCA AACAGGAT

15

18

(2) INFORMATION FOR SEQ ID NO: 67

(i) SEQUENCE CHARACTERISTICS:

20

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 67  
ACCAGCACCA AGAGGATG

25

18

(2) INFORMATION FOR SEQ ID NO: 68

30

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 68  
TTTTGATAAA GACCAGCA



18

## (2) INFORMATION FOR SEQ ID NO: 69

## 5 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 69  
TATTGGTTGG CTTCTTGG

18

## 15 (2) INFORMATION FOR SEQ ID NO: 70

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

20 (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 70  
GGGTTCTGC TTGGGGTG

18

25

## (2) INFORMATION FOR SEQ ID NO: 71

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

30 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 71  
GTCGGGAAAA TTGATCTC

18

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## (2) INFORMATION FOR SEQ ID NO: 72

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 72

GATCGTCGGG AAAATTGA

18

10

## (2) INFORMATION FOR SEQ ID NO: 73

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 73

GGAGCCAGGA AGATCGTC

15

20

18

## (2) INFORMATION FOR SEQ ID NO: 74

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 74

TGGAGCCAGG AAGATCGT

25

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18

## (2) INFORMATION FOR SEQ ID NO: 75

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

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(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 75

5 TGGAGCAGCA GTGTTGGA

18

(2) INFORMATION FOR SEQ ID NO: 76

10 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 76

GTAAAGTCTC CTGCACTG

18

20 (2) INFORMATION FOR SEQ ID NO: 77

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

25 (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 77

TGGCATCCAT GTAAAGTC

18

30

(2) INFORMATION FOR SEQ ID NO: 78

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

35 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 78  
CGGTTGGCAT CCATGTAA

18

5

(2) INFORMATION FOR SEQ ID NO: 79

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

10 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 79  
CTCTTTGCCA TCCTCCTG

18

15

(2) INFORMATION FOR SEQ ID NO: 80

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

20 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 80  
CTGTCTCTCC TGCACTGA

25

18

(2) INFORMATION FOR SEQ ID NO: 81

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 81  
GGTGCAGCCT CACTGTCT

35

18

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## (2) INFORMATION FOR SEQ ID NO: 82

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 82

AACTGCCTGT TTGCCAC

## (2) INFORMATION FOR SEQ ID NO: 83

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 83

CTTCTGCCTG CACCCCTG

## (2) INFORMATION FOR SEQ ID NO: 84

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 84

ACTGACTGGG CATAGCTC

## (2) INFORMATION FOR SEQ ID NO: 85:

## (i) SEQUENCE CHARACTERISTICS:

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(A) LENGTH: 1004 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 85:

GCCTCGCTCG GCGCCCCAGT GGTCCTGCCG CCTGGTCTCA CCTCGCCATG  
GTTCGTCTGC CTCTGCAGTG CGTCCTCTGG GGCTGCTTGC TGACCGCTGT  
CCATCCAGAA CCACCCACTG CATGCAGAGA AAAACAGTAC CTAATAAACA  
10 GTCAGTGCTG TTCTTTGTGC CAGCCAGGAC AGAAACTGGT GAGTGACTGC  
ACAGAGTTCA CTGAAACGGA ATGCCTTCCT TGCGGTGAAA GCGAATTCCT  
AGACACCTGG AACAGAGAGA CACACTGCCA CCAGCACAAA TACTGCGACC  
CCAACCTAGG GCTTCGGGTC CAGCAGAAGG GCACCTCAGA AACAGACACC  
ATCTGCACCT GTGAAGAAGG CTGGCACTGT ACGAGTGAGG CCTGTGAGAG  
15 CTGTGTCCTG CACCGCTCAT GCTCGCCCGG CTTTGGGGTC AAGCAGATTG  
CTACAGGGGT TTCTGATACC ATCTGCGAGC CCTGCCCAGT CGGCTTCTTC  
TCCAATGTGT CATCTGCTTT CGAAAAATGT CACCCTTGGA CAAGCTGTGA  
GACCAAAGAC CTGGTTGTGC AACAGGCAGG CACAAACAAG ACTGATGTTG  
TCTGTGGTCC CCAGGATCGG CTGAGAGCCC TGGTGGTGAT CCCCATCATC  
20 TTCGGGATCC TGTTTGCCAT CCTCTTGGTG CTGGTCTTTA TCAAAAAGGT  
GGCCAAGAAG CCAACCAATA AGGCCCCCA CCCCAGCAG GAACCCAGG  
AGATCAATTT TCCCGACGAT CTTCTGGCT CCAACACTGC TGCTCCAGTG  
CAGGAGACTT TACATGGATG CCAACCGGTC ACCCAGGAGG ATGGCAAAGA  
GAGTCGCATC TCAGTGCAGG AGAGACAGTG AGGCTGCACC CACCCAGGAG  
25 TGTGGCCACG TGGGCAAACA GGCAGTTGGC CAGAGAGCCT GGTGCTGCTG  
CTGCAGGGGT GCAGGCAGAA GCGGGGAGCT ATGCCAGTC AGTGCCAGCC  
CCTC

1004

(2) INFORMATION FOR SEQ ID NO: 86:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single



(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 86:

CAGAGTTCAC TGAAACGGAA TGC

23

5

(2) INFORMATION FOR SEQ ID NO: 87:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 base pairs

(B) TYPE: nucleic acid

10

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 87:

GGTGGCAGTG TGTCTCTCTG TTC

23

15

(2) INFORMATION FOR SEQ ID NO: 88:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 base pairs

(B) TYPE: nucleic acid

20

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 88:

TTCCTTGCGGTGA AAGCGAATTC CT

22

25

(2) INFORMATION FOR SEQ ID NO: 89:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 20 base pairs

(B) TYPE: nucleic acid

30

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 89:

GAAGGTGAAG GTCGGAGTC

19

35

(2) INFORMATION FOR SEQ ID NO: 90:

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## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 90:  
GAAGATGGTG ATGGGATTTC

20

## (2) INFORMATION FOR SEQ ID NO: 91:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 91:  
CAAGCTTCCC GTTCTCAGCC

20

20

## (2) INFORMATION FOR SEQ ID NO: 92:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 92:  
AGTGGTCCTG CCGCCTGGTC

20

30

## (2) INFORMATION FOR SEQ ID NO: 93

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

35

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 93  
GAACAGCACT GACTGTTT

18

(2) INFORMATION FOR SEQ ID NO: 94

5

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 94  
AGAACAGCAC TGACTGTT

18

(2) INFORMATION FOR SEQ ID NO: 95

15

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 95  
AAGAACAGCA CTGACTGT

20

18

(2) INFORMATION FOR SEQ ID NO: 96

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 96  
AAAGAACAGC ACTGACTG

30

18

(2) INFORMATION FOR SEQ ID NO: 97

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

35

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 97  
CAAAGAACAG CACTGACT

18

(2) INFORMATION FOR SEQ ID NO: 98

5

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 98  
ACAAAGAACA GCACTGAC

18

(2) INFORMATION FOR SEQ ID NO: 99

15

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 99  
CACAAAGAAC AGCACTGA

20

18

(2) INFORMATION FOR SEQ ID NO: 100

25

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 100  
GCACAAAGAA CAGCACTG

30

18

(2) INFORMATION FOR SEQ ID NO: 101

35

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 102  
GGCACAAAGA ACAGCACT

18

(2) INFORMATION FOR SEQ ID NO: 103

5

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 103  
GCTGGCACAA AGAACAGC

18

(2) INFORMATION FOR SEQ ID NO: 104

15

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 104  
GGCTGGCACA AAGAACAG

20

18

(2) INFORMATION FOR SEQ ID NO: 105

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 105  
TGGCTGGCAC AAAGAACA

30

18

(2) INFORMATION FOR SEQ ID NO: 106

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

35

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91



(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 106  
CTGGCTGGCA CAAAGAAC

18

(2) INFORMATION FOR SEQ ID NO: 107

(i) SEQUENCE CHARACTERISTICS:

5

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 107

10

CCTGGCTGGC ACAAAGAA

18

(2) INFORMATION FOR SEQ ID NO: 108

(i) SEQUENCE CHARACTERISTICS:

15

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 108

20

TCCTGGCTGG CACAAAGA

18

(2) INFORMATION FOR SEQ ID NO: 109

(i) SEQUENCE CHARACTERISTICS:

25

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 109

GTCTGGCTG GCACAAAG

18

30

(2) INFORMATION FOR SEQ ID NO: 110

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

35

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 110

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TGTCCTGGCT GGCACAAA

18

## (2) INFORMATION FOR SEQ ID NO: 111

## (i) SEQUENCE CHARACTERISTICS:

5

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 112

10

CTGTCCTGGC TGGCACAA

18

## (2) INFORMATION FOR SEQ ID NO: 112

## (i) SEQUENCE CHARACTERISTICS:

15

(A) LENGTH: 18

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 112

20

TCTGTCCTGG CTGGCACA

18

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